Chemistry 251 : Organic Chemistry I
Fall Semester 2013

Professor: Dr. John Barbaro–
Office: Tyler 203
Phone: 238-7372
E-mail: barbaroj@rocky.edu

Course Description

This course is the first semester of the CHM 251-252 organic chemistry series. This course will introduce the fundamental chemistry of organic compounds: their structures, nomenclature, physical and chemical properties, stereochemistry, reactivities, reaction mechanisms, and syntheses.

Course Prerequisite

Completion of CHM 102 (or an equivalent course) with a grade of C or higher. Students are also assumed to have completed MAT 110 or above before taking this course.

Class Objectives

In this course, a student will learn:

1. the general properties and reactivities of organic compounds;
2. how to draw the various structures used to represent organic compounds;
3. some of the terminology and nomenclature used in organic chemistry;
4. the basic concepts regarding the stereochemistry of organic compounds;
5. how to draw mechanisms of organic reactions; and
6. various functional group transformations and their use in multistep synthesis.

Required Texts

Organic Chemistry, Janice Gorzynski Smith; 4th Edition

Study Guide and Solutions Manual for Organic Chemistry, Janice Gorzynski Smith; 4th Edition

Experiments in Organic Chemistry, Richard Hill and John Barbaro; 3rd Edition

Course Moodle Site

There is a Moodle site associated with this course. Course handouts and email notifications to the class will be made using this site. The access code for and information about registering for this site will be given during the first week of classes.

Office Hours

If you have any questions or are confused about any of the material that I cover in the class, please come and see me. My office hours are Monday, Wednesday, Friday 10:00 - 11:00 a.m., and Thursday 11 - 11:45 a.m. I will try to be available during the week as much as possible outside of these scheduled hours.

If you need to meet with me but cannot attend my scheduled office hours, please see me after class and we will schedule a meeting time that is mutually convenient.

Attendance

Daily attendance in this class is both mandatory and necessary. The class starts at 11:00 a.m. and runs until 11:50 a.m. I expect you to be on time and to stay for the entire class period. Please be attentive and quiet while you are in class. If you come to class late, or if you have to leave class early, please do so quietly as a courtesy to the other students in the class.

Lecture will be my main means of communicating with you. Missing even one lecture will likely have a substantial negative impact on your performance in the class. My goal in lecture is to explain the material in the manner that I expect you to be able to use it. When I write the test questions, I will assume that you are familiar with all of the material that was covered in lecture, regardless of whether or not it is in the textbook.

Course Content

We will cover the following topics from the Smith text in CHM 251:

Structure and Bonding	Chapter 1
Acids and Bases	Chapter 2
Functional Groups	Chapter 3
Alkanes	Chapter 4
Stereochemistry	Chapter 5
Organic Reactions	Chapter 6
Alkyl Halides and Nucleophilic Substitution	Chapter 7
Alkyl Halides and Elimination Reactions	Chapter 8
Alcohols, Ethers and Epoxides	Chapter 9
Alkenes	Chapter 10

It is essential that you attend class daily to get all of the information that you will be responsible for on the tests. While the lecture material for this course will generally follow the textbook's chapters. Even so, the lecture material will be presented with a slightly different emphasis than how it is presented in your textbook, and occasionally the lectures will contain material that is not discussed in your textbook.

Practice Problems

Organic chemistry is primarily a problem-solving course. In this class you cannot simply memorize the material the night before a test and expect to do well. The only way to do well in this course is to become comfortable applying learned concepts to solve previously unseen problems. The problem-solving and critical thinking skills that you develop in this class will serve you well in the future regardless of your field of study.

There is a list of selected problems from the textbook chapters posted on the course's Moodle site. These problems will provide you with some initial practice in using the important concepts of organic chemistry to solve problems. Not only should you work the assigned problems found at the end of the chapters in the textbook, but also as many additional problems as are necessary for you to understand and become comfortable working with the material. There are thousands of practice problems available for practice, both in other textbooks and on the web. It is up to you to find these problems. I can assure you that the more problems that you work, the easier recognizing, understanding, and solving new problems becomes. Since this is what you will be required to do on the tests, it behooves you to work as many different problems as it takes to become comfortable with the material.

If you have any difficulties with or questions about any of the chapter problems or other problems that you are working on, please come by and see me either after class or during my office hours.

Cell Phone Use / Penalties

All cell phone use is strictly prohibited during lecture. Please turn off your cell phone and put it away before entering the classroom. Once the lecture begins, anyone observed or even suspected of using their cell phone (talking, texting, whatever) will lose five points on their next exam for each violation.

Tests

Your grade in the lecture portion of the course will be based on four in-class tests and a final exam. The schedule for these tests is as follows:

Test 1	Wednesday, September 18
Test 2	Wednesday, October 9
Test 3	Wednesday, November 6
Test 4	Monday, November 25
Final Exam	Thursday, December 12 (12:15 p.m. - 2:15 p.m.)

Early or late exams will not be given. The final exam for the course is comprehensive.

On every exam, it will be assumed that you are familiar with all of the material covered from the beginning of the course. While very little of this material will be tested directly, often you will need to use previously covered concepts to arrive at the answer to a test question.

On all of the exams, ***read the questions carefully and answer what is being asked***. Partial credit for answers will be given where, in my judgement, it is appropriate. Just because you write something down to answer a question does not mean that you will get partial credit for your answer – a whole lot of correct information that does not address the question will not receive any credit.

Each in-class exam and the final exam will be scored out of 100 points. If you miss an exam for any reason without a valid excuse, then you will receive a zero on that exam. If you miss more than one exam, or if you miss the final exam, you will receive an I or an F in the course depending on the circumstances. Any problems with or any questions about the grading on the in-class tests needs to be brought to my attention ***within forty-eight hours*** of when I return the papers to the class. I will not change the grades on any exams after that time.

Grading

Your grade in the lecture will be combined with your grade in the laboratory to determine your final grade for the course. The lecture counts for 75% of your overall course grade, and the laboratory counts for 25% of your overall course grade.

Your grade in the lecture portion of the course will be determined out of 100% as follows:

Four in class tests	80%
Final exam	20%

Each in-class exam and the final exam will be scored out of 100 points. If you miss an exam for any reason without a valid excuse, then you will receive a zero on that exam. If you miss more than one exam, or if you miss the final exam, you will receive an I or an F in the course depending on the circumstances. Any problems with or any questions about the grading on the in-class tests needs to be brought to my attention ***within forty-eight hours*** of when I return the papers to the class. I will not change the grades on any exams after that time.

Since we all have a bad day on occasion, in determining your final grade for the class I will replace your lowest test score on the tests with the average of your lowest and highest test scores. For instance, if your highest test score is 90 and your lowest score is 60, I will replace the low score of 60 with a 75 (the average of 90 and 60) when I compute your final grade. No other adjustments to your test scores will be made.

The final grades in the course will be assigned using the following grading scale:

$\geq 88\% = A;\ 87 - 76\% = B;\ 75 - 64\% = C;\ 63 - 50\% = D;\ < 50\% = F$

These grade cut-offs are absolute. I do not curve final grades nor do I round grades up at the end of the semester. The ranges for each letter grade will be divided into thirds to determine plus and minus grades within each letter grade.

Withdrawing From the Course

You may withdraw from a course and receive a grade of W at any time up to and including Friday, October 25. After that date, you may no longer withdraw from the course with a W and you must receive a grade in the course.

Academic Honesty

Cheating of any kind will not be tolerated in this class and will be dealt with harshly. The Academic Integrity Policies of Rocky Mountain College are available both in the college catalog and on the college's web site at the following url:

http://www.rocky.edu/student-life/dean-student-life/StudentCodeOfConduct.php

CHM 251 – Organic Chemistry Laboratory Syllabus
Fall Semester 2013

Wednesdays 1-4 p.m. or Thursdays 2-5 p.m
Laboratory: Bair 116

Instructor: Dr. John Barbaro
Tyler 203
238-7372
barbaroj@rocky.edu

Lab Manual

Experiments in Organic Chemistry, Richard Hill and John Barbaro; 3rd Edition

Schedule of Experiments

Date	Experiment	Reference
Sept. 4,5	Check in	
Sept. 11, 12	Recrystallization	T1, 2, and 3, E1
Sept. 18, 19	Melting Point	T1, 2, and 3, E1
Sept. 25, 26	Extraction of Trimyristin from Nutmeg	T1C, T9, E4B
Oct. 2,3	Vegetable Oil from Potato Chips	Handout
Oct. 9, 10	Acid-Base Extraction	Handout
Oct. 16, 17	**Midterm break – no lab**	
Oct. 23, 24	Distillation	T4, E2
Oct. 30, 31	Hydrogenation of Olive Oil	E26
Nov. 6,7	Synthesis of Salicylic acid	Handout
Nov. 13, 14	Synthesis of Aspirin	E19
Nov. 20, 21	Polymer Chemistry	Handout
Nov. 27, 28	**Thanksgiving break – no lab**	
Dec. 4,5	TBA / Clean up	

Before coming to lab each week, take the time to read the experiment carefully and write up the prelab. The better you understand the procedures, techniques, safety precautions, and any apparatus that you will be working with in lab, the more successful and safer your laboratory experience will be.

Lab Notebook

You will need a sewn-bound composition notebook for this class. You may use one of your lab notebook from general chemistry last year if there is still room in it. Spiral bound and loose-leaf notebooks are not acceptable.

Lab Objectives

By taking this laboratory course, a student will

1. learn to work safely and confidently with chemicals in the laboratory;
2. develop proficiency with some techniques used in an organic chemistry lab;
3. gain some experience with the instrumentation used in an organic chemistry lab; and
4. improve his/her ability to interpret experimental results.

Attendance

Weekly attendance in lab is both mandatory and necessary. I expect you to be on time for the prelab lecture and to stay in the laboratory until that day's experiment is completed and your work area is clean. Unlike what you are used to in other teaching laboratories, long heating times are sometimes required for many of the experiments in this course. You must remain in the laboratory during these waiting periods and stay attentive to your experiment. You may not use electronic devices (iPods, cell phones, etc.) to pass the time during these heating periods, nor may you study anything other than organic chemistry. This is a perfect time to talk to me about questions that you have from either the lecture or the lab.

Missing Lab

There are no make-up labs in this course. Students who miss a laboratory period without an excused absence will receive a grade of zero on the write-up for that experiment. If, for any reason, you miss three laboratory periods, you will receive either an I or an F in the lab.

To have an absence from lab excused, you must provide me with written documentation (a doctor's note, etc.) explaining why you missed the lab session. If you know in advance that you will have to miss a lab session because of an college-sponsored activity, please bring documentation concerning your absence to me as far in advance of the event as possible. The techniques that we will covert this semester are used throughout the course, so you are responsible for any information presented in lab even if you are absent.

Safety Rules and Hazardous Waste

The safety rules described on pages G1-1 to G1-2 in your lab manual must be followed by everyone working in the organic chemistry laboratory. Safe laboratory practice is based on understanding and respect, not on fear. The safety regulations are intended to help you work safely with chemical reagents in the laboratory.

In addition, specific hazards and precautions associated with each experiment are given in the lab manual. Before beginning an experiment, be sure you have read this information and that you understand it. Specific safety precautions relevant to each experiment will be discussed during the pre-lab lecture.

Do not hesitate to ask if you have questions about any of the safety precautions. All safety rules, especially the wearing of goggles in the laboratory, will be strictly enforced.

Many common laboratory solvents used in this lab – such as hexane, methylene chloride, xylene, ligroin, toluene, etc., – along with most of the chemical reagents are classified as hazardous materials. The chemicals used in the lab are safe to work with at the concentrations and volumes that you will be exposed to, but you still must take care when handling any chemicals in the lab.

You will generate several different types of chemical waste while working in the lab which must be disposed of properly. Please read and follow the instructions for dealing with hazardous waste that are found on page G1-3 of your laboratory manual.

Cell Phone Use / Penalties

Electronic devices such as lap top computers, cell phones, cd or mp3 players, etc., are not allowed in the laboratory. These devices create safety issues because they take your attention away from the experiment at hand.

Please turn off your cell phone and all other electronic devices BEFORE entering the prelab lecture room and the laboratory. Once the prelab lecture or the laboratory session begins, anyone observed or suspected of using their cell phone (talking, texting, whatever), iPod, etc., will lose 5 points on their next lab report for each violation.

Keeping a Laboratory Notebook

Keeping a complete and accurate record of experimental data is vital in any scientific discipline. An important part of this course is learning how to keep a laboratory notebook. Your laboratory notebook is a permanent record of what did and what you observed in the laboratory. If you establish good record keeping habits now they will serve you throughout your career.

A detailed description of what must be included in each of your lab reports can be found on pages G2-2 to G2-5 in your lab manual. You will have a lab write-up for each experiment that you do in this lab.

Begin the write-up for each experiment on a new page in your notebook. Always use ink when writing in your laboratory notebook; recording data in a laboratory notebook in pencil is unacceptable because it is erasable which allows changes to be made to the data. If you make a mistake in your notebook, do not erase it or use white-out to cover it up, just cross out the error and rewrite the correct information. While neatness is desirable in keeping a laboratory notebook, accuracy is more important.

Your laboratory notebook should contain enough detail that you or someone else can repeat the experiment just from reading your notebook. Keeping records with this type of detail is essential in a research laboratory, but it is equally important in the teaching laboratory because your notes might help you or me determine what went wrong if an experiment fails to work. As you perform each experiment, record all data (weights, volumes, reaction times, melting and boiling points, calculations, etc.) and observations directly in your lab notebook. Do not write things down on a scrap of paper to copy later into your notebook – this is too easily misplaced or inadvertently thrown away, resulting in the loss of your data.

Turning in Worksheets and Lab Reports

The bulk of your grade for this course will be based on your grades on the worksheets / lab reports. The material for grading will be handed as follows:

1. The prelab portion of your lab report is due at the beginning of your laboratory session on each day that we begin a new experiment. The prelab consists of items a-f listed on page G2-2 of your manual, and must be written up in your notebook ***before*** the lab starts. Your notebook will be checked at the beginning of the lab period to see if this information is complete. Failure to have the complete pre-lab portion of your lab report written in your notebook before the start of that day's lab will result in 20 points being deducted from that experiment's overall score.

2. The week after you have completed an experiment, either a worksheet or a lab report is due at the beginning of the designated lecture period. Ten points will be deducted from your grade on the experimental write-up for each day that your write-up is late. (Lab reports are considered late if they are turned in any time after the beginning of the class period that they are due.) Lab reports turned in more than one week late will not be graded and will be given a grade of zero. These write-ups will be graded and returned to you within a week.

Do not dispose of any graded material that I return to you until after you have received your final grade in the lab.

Grading and Late Penalties

Each experimental write-up will be graded out of 100 pts.

Your grade in the laboratory portion of the course is worth 25% of your overall course grade for CHM 251. Your overall lab grade will be based on how efficiently you work in the laboratory and on your lab write-ups.

Lab preparedness	5%
Work habits and adherence to safety rules	60%
Lab report grades	35%

OPI/PEPPS Table for Syllabi
CHM 251 Organic Chemistry I

Standard	Course Objective
10.58.522 SCIENCE	
(2, a, iii, d) demonstrate understanding and experience of how to develop and maintain the highest levels of safety in classrooms, stockrooms, laboratories, and other areas related to instruction in science;	Lab objective 1
(5, c) systemic and quantitative study of the fundamental topics of chemistry, interrelated and illustrated with descriptive and historical perspectives, as well as the applications of chemistry in society;	Course objectives 1-6
(5, d) conceptual understanding of organic, inorganic, analytical, physical, and biochemistry, and their relationships with each other;	Course objectives 1-6
(5, h) designing, developing, and evaluating field, demonstration, and laboratory instructional activities, and in using special skills and techniques with equipment, technologies, facilities, and chemicals which support and enhance curricula and instruction in chemistry;	Lab objectives 2 & 3